CSE341 Quiz 01

ID: **Total Marks: 15**

Duration: 20 mins

Name: **Sec:**

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1. Suppose we have a smart light bulb which is very small in size and can connect to a remote. Its functionality ranges from turning the light off and on and dimming only. The light bulb is power efficient and requires minimal processing power to run the functionalities. Explain with **at least four proper reasoning** whether a microcontroller or microprocessor is used for the light bulb. **[Marks - 3]**

Smart bulb uses a microcontroller. Microcontroller requires a small size to be set up. The functionality in a microcontroller which is predefined and functionality is limited. The memory required is low and the processing power is low as it requires low clock pulses.

2. John makes a statement "RAM is volatile as it can still store data after there is power loss or disruption in electricity supply". Is this **entire** statement correct or false? *If false, rewrite the correct statement.* **[Marks - 1]**

False. Ram is volatile as data is erased automatically if there is power disruption.

3. The function of the register is to store data temporarily. Is this statement correct or false? *If false, rewrite the correct statement.* **[Marks - 1]**

True

4. The size of the data bus is 32 bit and the address bus is 24 bit. **Calculate**: **[Marks - 3]**
   a) The maximum size of the memory that can be used in this system.
   b) Is a memory of 20 MB fully utilised? **Explain briefly.**
   c) Is a memory of size 6 MB fully utilised? **Explain briefly**. [Can use the next page for this ans as well.]

a) Address bus determines the size of memory.

2^{24} = 16777216 byte

16777216 / (1024^2) = 16 MB

b) No. Only 16 MB of memory is utilized. However, the remaining 4MB can not be accessed.

c) The full 6 MB memory is utilized.

5. Identify which bus is used for this following Statement. If the statement is wrong, write WRONG. **[Marks - 0.5 x 4 = 2]**

a) This bus is unidirectional and is used to carry addresses only. - Address bus

b) This bus is used to carry control signals only. - Control Bus

c) This bus is bidirectional and carries address only. - Wrong

d) This bus carries both data and also memory read/write control signals. - Wrong

6. The memory that is used is of size 256 MB. **Calculate** with proper working the size of the address bus in bits. Can the size of the data bus be determined from this information?**Answer in yes or no**. ? **[Marks - 2]**

$\log_2(256 * (1024)^2)$ = $\log_2(268435456)$ = ceiling value of (28 bit)

= 28 bit

No. Data bus only determines the word length.

7. The fourth address of the segment is (42F13)h. And the physical address to access is F1142h. **Calculate** the starting address of the segment and the segment number. Then **find** the offset value. Finally **calculate** the third *last address* for the segment. **[Marks - 1+ 1 + 1 = 3]**

Starting address of the segment = 42F13 - 0003h = 42F10h.

Offset value = F1142 - 42F10 = AE232. The offset can not be 5 hex digits. So invalid.

Third *last address* = 42F10h + FFFFh - 0002h = 52F0D

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Smart bulb uses a microcontroller. Microcontroller requires a small size to be set up. The functionality in a microcontroller which is predefined and functionality is limited. The memory required is low and the processing power is low as it requires low clock pulses.

2. John makes a statement "ROM is not volatile as it can store data after there is power loss or disruption in electricity supply". Is this **entire** statement correct or false? *If false, rewrite the correct statement.* **[Marks - 1]**

True

3. The function of the register is to store data and it is located outside of the CPU. Is this statement correct or false? *If false, rewrite the correct statement.* **[Marks - 1]**

False. Register is located inside the CPU.

4. The size of the data bus is 32 bit and the address bus is 26 bit. **Calculate**: **[Marks - 3]**
   a) The maximum size of the memory that can be used in this system.
   b) Is a memory of 50 MB fully utilised? **Explain briefly.**
   c) Is a memory of size 80 MB fully utilised? **Explain briefly**. [Can use the next page for this ans as well.]

a) Address bus determines the size of memory.

2^{26} = 67108864 byte

67108864 / (1024^2) = 64 MB

b) 50 MB of memory is fully utilized.

c) Only 64 MB can be accessed. The rest 16 MB can Not be accessed.

5. Identify which bus is used for this following Statement. If the statement is wrong, write WRONG. **[Marks - 0.5 x 4 = 2]**

a) This bus is bidirectional and is used to carry addresses only. - Wrong

b) This bus is used to carry data only. - Data bus

c) This bus is unidirectional and carries address only. - Address bus

d) This bus carries I/O read/write control signals. - Control Bus

6. The memory that is used is of size 4 MB. **Calculate** with proper working the size of the address bus in bits. Can the size of the data bus be determined from this information?**Answer in yes or no**. ? **[Marks - 2]**

$\log_2(4 * (1024)^2) = \log_2(4194304) =$ ceiling value of (22 bit)

= 22 bit

No. Data bus only determines the word length.

7. The sixth address of the segment is (42F15)h. And the physical address to access is F1142h. **Calculate** the starting address of the segment and the segment number. Then **find** the offset value. Finally **calculate** the *fifth last address* for the segment.

Starting address of the segment = 42F15 - 0005h = 42F10h.

Offset value = F1142 - 42F10 = AE232. The offset can not be 5 hex digits. So invalid.

Fifth *last address* = 42F10h + FFFFh - 0004h = 52F0Bh

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False. Ram is volatile as data is erased automatically if there is power disruption.

3. The function of the register is to store data temporarily. Is this statement correct or false? *If false, rewrite the correct statement.* **[Marks - 1]**

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b) No. Only 16 MB of memory is utilized. However, the remaining 4MB can not be accessed.

c) The full 6 MB memory is utilized.

5. Find two logical address for the following physical address **[Marks - 1 x 2 = 2]**

a) F1412h

b) 00013h

6. The memory that is used is of size 256 MB. **Calculate** with proper working the size of the address bus in bits. Can the size of the data bus be determined from this information?**Answer in yes or no**. ? **[Marks - 2]**

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2^{26} = 67108864 byte

67108864 / (1024^2) = 64 MB

b) 50 MB of memory is fully utilized.

c) Only 64 MB can be accessed. The rest 16 MB can Not be accessed.

5. Find two logical address for the following physical address **[Marks - 1 x 2 = 2]**
   a) B1231h
   b) 00043h

6. The memory that is used is of size 4 MB. **Calculate** with proper working the size of the address bus in bits. Can the size of the data bus be determined from this information?**Answer in yes or no**. ? **[Marks - 2]**

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